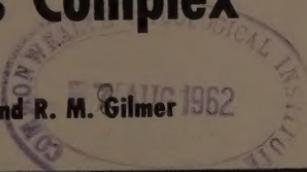


Planting Practices for Control of Cherry Yellows Virus Complex

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An Extension publication of the
New York State College of Agriculture,
a unit of the State University,
at Cornell University,
Ithaca, New York

March 1961

Cooperative Extension Service, New York State College of Agriculture at Cornell University
and the United States Department of Agriculture cooperating. In furtherance of Acts of
Congress May 8, June 30, 1914. M. C. Bond, Director of Extension, Ithaca, N. Y. PS-7 1/2 M

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The yellows and ring spot virus complex causes the most serious reduction of sour cherry yields in New York State. Fruit set is reduced as soon as infection occurs; growth is reduced because leaf efficiency is impaired; and, as the yellows disease develops, buds that normally produce lateral shoots and fruit spurs produce flowers instead. Once these buds have blossomed, no additional growth occurs at the nodes where they are borne, and long bare twigs and branches eventually develop. The only fruits on such branches develop on the terminal shoots. The final result is a small number of blossoms and an equally small number of leaves, many of which drop in June because of the disease. In addition, the weakened buds are more susceptible than normal to winter injury, and the twigs finally become so weakened that dieback occurs.

Because overall damage to the tree progresses once infection has occurred, trees that are infected at the time of planting yield least; the older a tree is before it is infected, the closer its annual yield will be to that of a healthy tree.

Many strains of these viruses exist, with correspondingly different degrees of pathogenicity. The worst strains usually can be recognized, even without characteristic leaf symptoms, and infected trees can be eliminated.

Ring spot symptoms are most prominent during the two-week period following petal fall. Typically, they are produced by a given tree for only one or two years, when the tree is in the initial "shock" stage. "Etch" type symptoms, characterized by darkened depressed fine lines and rings, develop on the upper surfaces of the leaves (figure 2). Dead tissue may develop on leaves in this stage of symptom expression. Sometimes the lines are broad, chlorotic and not depressed, in contrast to those illustrated.

Yellows symptoms develop later in the year, commonly beginning three to four weeks after petal fall. Leaves develop yellow color in different patterns and drop, along with other leaves that do not turn yellow (figure 1).

The practice of replanting trees in old orchards exposes new trees to large sources of nearby inoculum. The interplants become diseased quickly and, even before they show symptoms or suffer serious damage, provide inoculum for infection of subsequent replants.

Figure 1. Virus yellows symptoms on an old tree are yellowing, defoliation, and sparseness of foliage.



Figure 2. Shock ring-spot symptoms of the etch type. Note darkened depressed lines and rings. One leaf shows necrosis on the basal half and a very dark necrotic area across the middle; the tip shows little or no effect of the disease.

PRACTICES TO PREVENT SERIOUS DAMAGE

More than ten years of research and many years of experience show that cherry yellows need not be so serious as it is at present. Spread of the viruses is reduced if new plantings are made in solid blocks isolated from other cherry orchards. Many old orchards that were planted in isolation are producing much better crops than those in which constant replanting has been practiced, or in which a high percentage of trees were diseased at planting.

Replanting in old orchards must be stopped; all trees in old orchards should be removed at the same time. The block should not be replanted until all large roots have been completely removed and the soil has good tilth, proper nutrient level, adequate organic matter content, and suitable pH. Adequate soil preparation requires one year or more. Any factor unfavorable for growth will add to the damage by the virus when the trees eventually become infected. The trees should be as virus free as possible, for this is the only means of excluding serious forms of the diseases.

There appears to be a delay of a few years before the viruses begin to spread from trees that were diseased at planting to neighboring healthy trees. Therefore, it is suggested that any tree showing yellows symptoms during the first years after planting be removed at once. Trees that show such severe symptoms of ring spot that twigs are killed, trees that develop unusually poor fruit spur systems, and trees that grow very poorly without explanation also should be removed. If such trees are removed, groups of trees in which a low percentage are infected by the less severe virus strains can be planted. Such groups of trees are those most likely to be available in the nurseries at the present time. Because of the widespread use of budwood from isolated virus-free foundation plantings, trees have been greatly improved during the last ten years.

SUGGESTED PROGRAMS

The practices described in the following outline can yield profitable results. It must be recognized, however, that there is no way to prevent cherry yellows virus infection for the entire life of an orchard. Nevertheless, careful planning will reduce the rate of spread. Ordinarily, it is not feasible to maintain sour cherry orchards for more than 20 to 25 years.

For orchards less than ten years of age

1. Remove all trees that grow poorly, fail to set up a good spur system, or show yellow leaf symptoms characteristic of the virus disease. This practice will remove a potential source of infection to other young trees and will eliminate border trees.



Figure 3. Branch from a tree infected with yellows virus for several years. Each twig shows several years' extension in terminal length with no lateral shoots or fruit spurs.

2. Replace trees only if the original planting is five years old or younger. Replant with the best trees available, preferably with those having a certificate for freedom from viruses.

For orchards more than ten years of age

1. Destroy all trees that show many yellow leaves in June, produce a poor spur system, or have many dead twigs. Such trees do not pay for the care they receive and they endanger other trees in the orchard.
2. Do not replace old trees. New trees will soon become infected from remaining diseased trees and will not pay for their up-keep before it is time to remove the entire orchard. Trees removed for reasons other than virus infection should not be replaced for the same reason.
3. Bulldoze complete blocks if the trees are so diseased that a normal crop has not been harvested for a few years. Such orchards cannot be returned to profitable production.

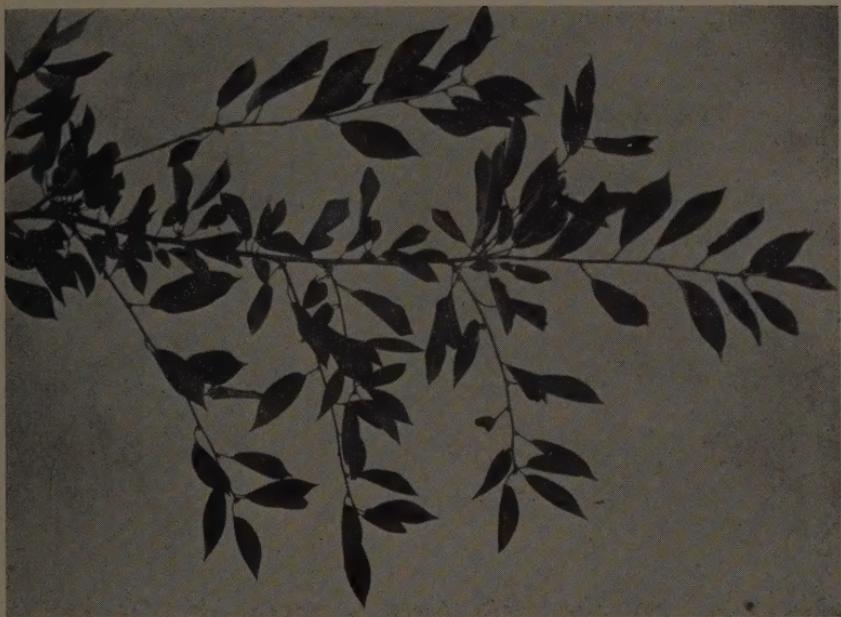


Figure 4. Branch from a virus-free tree shows fruit spurs at several nodes on the previous year's shoots. At other such nodes, lateral shoots are produced; these will produce additional fruit spurs the following year.

Planting for the future

1. Isolate new plantings. Make new plantings as far as possible from existing cherry blocks and other stone fruits. At least 100 feet of isolation is a necessity, but distances of 500 feet or more are preferable. Open fields between plantings of different ages provide suitable isolation, but may not be economical in areas of intensive fruit growing. An alternative is to plant apples or pears between cherry blocks or between cherry and other stone fruit blocks. Occasionally it may be necessary to reduce the size of individual plantings and to have more blocks of each kind of fruit. Smaller plantings will increase the cost of spraying and other orchard care operations, but increased cherry production will more than offset the added costs.

2. Make solid plantings. Avoid interplanting among older trees. When an orchard is prepared for replanting *all existing trees* in the old planting must be removed to eliminate a certain ~~area~~ of yellows virus.

Source

3. Purchase the best trees available. These should carry a certificate stating they were produced with virus-free buds. If such trees are not available, every effort should be made to obtain trees produced under a careful program designed to reduce the virus content of the trees. Horticultural inspectors will know whether sour cherry yellows is abundant in the different nursery blocks. A better plan is to contract with a nurseryman to produce virus-free trees two or three years in advance of your planting date. In many cases, the intervening time can be well spent in preparing the soil.

4. In addition to planting the best trees obtainable, profitable cherry production will depend primarily on the careful selection and preparation of planting sites. Soil condition and cultural care also are important phases of the program.

Because part of the damage caused by cherry yellows virus disease is to increase susceptibility to winter injury, other factors conducive to winter injury must be taken into account. One unfavorable growth factor might not result in winter injury, but added to the yellows virus disease, will cause damage. A case in point is potash deficiency. Pomologists have found recently that potassium levels higher than those previously thought adequate will help to reduce winter injury.

5. In new plantings, follow the roguing programs outlined on pages 5 and 6. Most nursery trees contain a variable percentage of affected trees.

INFECTION OF SWEET CHERRY TREES

Sweet cherries also are infected by cherry yellows virus disease, although leaves on affected trees do not turn yellow. Most varieties of sweet cherries appear to be less susceptible than sour cherries, but they are damaged to a significant degree. The precautions in purchase and planting of sour cherries should be followed for sweet cherries. It may not be wise to rogue out affected sweet cherry trees, however, because of the lack of diagnostic symptoms.